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### The Research Library and Scholarly Information

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***The Research Library and Scholarly Information; a future for librarians?***

The development of information and communication technology during the last couple of decades is reminiscent of the invention of the printing press in about 1450. Both have led to revolutionary new ways of disseminating information faster and on a broader scale. While the consequences could not be overseen in 1450, new ways of spreading information was a consequence of the invention. Newspapers started to appear, and the journal made its appearance.

The tempo of change brought about by the introduction of computers and world-wide communication networks in our time is greater than in the 15th century. ICT skills have become as essential to our lives as the ability to read and write, and at the tertiary level, ICT is increasingly playing a major role in research and teaching.

This article deals with ICT, knowledge and information, and the ways in which they are connected. A number of recent developments are surveyed. Communication within research communities and the distribution of research results is then discussed, and the various levels at which this takes place described. The distinctions between the levels are looked at in some detail.

The article then describes ICT's effect on the various ways and means by which knowledge and information is communicated. How this is likely to change both the way that knowledge and information is provided within the academic world and the roles of information professionals is also dealt with.

**The Research Library and Scholarly Information; a future for librarians?**

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**The discovery of the printing press, the rise of scholarship, and communication within the academic world**

The development of information technology reminds me in many ways of the discovery of the printing press. They both have given rise to revolutionary new ways of disseminating information faster and on a broader scale. In the 15th century, no-one had any awareness of the enormous impact that printing was to have. The first printed works were remarkably similar in appearance to the manuscripts that preceded them, and have consequently been termed "cradle books" (incunabula). Printing technology's effect on the community at large was only gradual, and in the initial stages affected the dissemination of learning and culture only to a minor degree. This had little to do with the new ways of producing information or the form the information was in; it was mainly because only few people had access to education and culture. Researchers were few in number. Long after the rise of printing,

academics were still exchanging ideas and research results by journeying to do so in person or by corresponding with each other. It was the way they had always transmitted their knowledge, and they remained true to the tradition.

It was only after the rise of the middle classes in the middle of the 17th century and the impetus this gave academic learning that the need for transmission of knowledge on a broader scale began to be felt.<sup>1</sup> The first academic journals appeared in 1665: the *Journal des Sçavants* in France and the *Philosophical Transactions of the Royal Society of London* in England. In the Netherlands, the *Nouvelles de la République* appeared in 1684. Journals made it possible for scholars to transmit their research results to a much larger number of scholars than was possible via personal correspondence or personal contacts. The academic journal quickly became a new medium for broad-scale presentation of research data and unambiguous accreditation and quality control of research results. It boosted the transmission of academic information enormously while at the same time boosting its quality.

### **Information and communication technology and the transmission of academic knowledge**

In recent decades, we have been able to witness another such leap forward, though one that has taken much less time to get underway than the previous one. The “discovery” and implementation of information and communication technology has made possible a vast increase in the amount of information, this time digital. It should be realised, though, that this is not only due to the application of information and communication technologies and techniques, but also to an array of social developments. The global population has grown enormously, and an increasing number of people have access to education and are taking part in science and culture.

The innovations were initially limited in scale. The first computerised systems were suspiciously like incunabula, and the on-line catalogues of the 1980s were no more than digitalised card systems. Search methods were inflexible and primitive. Despite this, ICT has undergone such rapid development during the past two decades that it is difficult to obtain an overview of how it is affecting society at large. This certainly applies to education and research at the tertiary level: in virtually all fields of research, ICT has led to the development of new methods and techniques. Thanks to ICT, research projects can now be carried out on a scale and to a degree that was previously unimaginable. And it looks as though electronic learning environments are going to revolutionise tertiary education.

All of this is having a significant effect on the provision of scholarly information, and consequently for university libraries. It is no wonder that the university library is higher up the list of administrative priorities than it has ever been before. It used to be looked down on as a desirable but somewhat stuffy institution that was really only useful for the humanities and otherwise served as a museum for the rest of the community. Nowadays, the entire

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<sup>1</sup> The pace of growth in the “academic business” is clearly reflected in the collections of university libraries. They remained limited in size during the centuries immediately following the introduction of printing. I will use my own university library as an example: it was founded in 1615, starting out with a collection of several hundred books. About two hundred years later, the collection had grown slowly and numbered about ten thousand works. This represents an average annual increase of fifty books per year during those two centuries! In the period following 1800, there was an increase in the number of books being printed: in the period 1800–1850, the book collection trebled to about 30,000 titles, and during the period 1850–1900 there was again a trebling, the collection reaching about 100,000 titles. The 20th century witnessed an explosive expansion in the size of the collection: in 1950, there were about 150,000 books, and by 2000, nearly three million.

university community, regardless of discipline, is immediately enthusiastic as soon as scholarly information facilities are mentioned. Having access to information is generally regarded as a critical factor in the success of education and research. Having a top-quality modern information infrastructure is one of the determiners of a university's attractiveness, and consequently of the strength of its competitive position in relation to other universities.

### **Scholarly information provision: some responses and counter responses to the traditional model**

There is, however, a less positive reason for the interest, which has to do with the price that has to be paid for scholarly information. The amount of information being generated is so enormous that it is impossible to try to acquire all of it. Not that this is a new situation: it is one that has been in existence for decades, after all, and does not represent a new challenge for university libraries. The professional skills of libraries lie in their being able to make a representative selection of all the scholarly information available at the global level, based on the literature needs of researchers, teachers and students. What is relatively new – and by this I mean the past quarter of a century – is the enormous increase in the price of information, and particularly that contained in academic journals. In the knowledge economy, information is valuable and has become an attractive source of income for commercial publishers. They should not be blamed for taking advantage of the market and setting prices that customers are prepared to pay. They have their own responsibilities towards their shareholders, after all, and their main goal cannot be the optimization of scholarly information provision for the benefit of the academic world for a cost that is as favourable as that world would wish. In point of fact, there need be no antagonism between these two – optimal provision of information and profit-making – as long as market forces are able to maintain a reasonable balance between them. However, during the past two decades, the effect of market forces on academic information has left much to be desired. Universities have kept aloof from the production and distribution of information created by their own academics, preferring to leave the task – one that requires specific knowledge and professional skills – to the publishers. Publishers have demonstrated that they are able to carry out this task well and impartially. They have been able to give added value to the processes of production and distribution by such things as peer reviews and quality assessments, resulting in a world-wide accepted system of certification and accreditation of research results. Its flaws have only become apparent since it became obvious that the system as a whole was starting to take on the characteristics of a monopoly.<sup>2</sup> Monopolies threaten the balance between market forces and prices, and this situation is no exception. The result has been an enormous increase in the price of academic journals and bibliographical databases, and increasing criticism from universities, university libraries and academics.

The fact that the rebellion has been late in getting underway has to do with a number of factors. In the first place, those who need the information – the researchers – are not those who foot the bill – the libraries. Such a situation is not conducive to a critical stance or to making policies to counteract the pricing politics of the publishing world. Moreover, publishers are by definition globally operating organisations, unlike libraries, whose existence depends on being able to organise effective information services for local users. They are primarily institutions that operate at the local level, though universities and university libraries

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<sup>2</sup> The process that led to this situation is convincingly described by Jean-Claude Guéron. See his article *In Oldenburg's Long Shadow: Librarians, Research Scientists, Publishers, and the Control of Scientific Publishing*. <http://www.arl.org/arl/proceedings/138/gueron.html>

are more and more starting to realise that they are going to have to organise themselves at the national and international levels as well. This realisation has led to various national and international cooperative arrangements, not only between libraries but also between universities and academics. They have recognised the importance of international lobbies and have demonstrated that they are able to make use of them to defend the interests of their users, albeit with mixed success.<sup>3</sup>

The result is that publishers on the one hand and libraries and universities on the other have had stimulating and sometimes heated discussions with each other about the form that scholarly information provision should take in the digital world and the conditions that need to be imposed. Actions and reactions have followed at a brisk tempo: publishers and universities/university libraries have looked critically at adapting copyright to cope with the digital world, each from their own point of view and line of approach. In some areas, both parties are prepared to adopt each other's point of view where certain issues are concerned,<sup>4</sup> but in others their positions are more or less diametrically opposed to each other.<sup>5</sup> Publishers have developed new pricing models under which they offer journals collectively and for a period of several years. To make what they have on offer more attractive, publishers are adding a variety of new facilities to existing journals: for example, links to other primary or secondary literature, notes on forthcoming articles and additional search facilities. What is so positive about this is that suppliers of information and users are able to see each other's point

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<sup>3</sup> Classic examples of this include the "library lobby", which in 1997 took part in the discussions on copyright during the international conference on the World Intellectual Property Organisation, and the activities that the library world has developed during the discussions on establishing and implementing European Guideline relating to copyright and associated rights.

<sup>4</sup> A good example of this is the discussion that publishers and universities are engaging in within the framework of ICOLC (*The International Coalition of Library Consortia*). The [Statement of Current Perspective and Preferred Practices for the Selection and Purchase of Electronic Information \(Update no. 1: December 2001\)](http://www.library.yale.edu/consortia/2001webstats.htm) (<http://www.library.yale.edu/consortia/2001webstats.htm>) has, in fact, become a basic principle for publishers and libraries. Publishers (including Elsevier Science) and universities have also been able to reach agreement in the [Guidelines for Statistical Measures of Usage of Web-Based Information Resources \(Update: December 2001\)](http://www.ifla.org/III/misc/pr310801.htm). Recently, IFLA (*The International Federation of Library Associations*) and IPA (*The International Publishers' Association*) have founded a joint steering committee charged with setting out the various mutual interests. (*Librarians and publishers working to a common agenda*: <http://www.ifla.org/III/misc/pr310801.htm>) See also *Publishers and librarians promote common principles on copyright in the electronic environment*: <http://www.ifla.org/V/press/ifla-ipa.htm>

<sup>5</sup> An increasing number of academics are demanding that articles should be freely accessible after a certain amount of time has elapsed. They have taken the initiative of founding the Public Library of Science (<http://www.publiclibraryofscience.org>). Via the Public Library's web site, academics and librarians can sign an open letter in which they call on publishers of academic literature to make journal articles available to PubMed Central and similar freely accessible archives six months after the articles have been published. The Public Library specialises in the bio-medical sciences. The signatories have also indicated that, in principle, they will no longer publish in journals that have not responded to the request. Thus far, more than 30,000 signatures have been added to the letter, about 500 of which have come from the Netherlands. About 100 journals have responded to the signatories' call, two thirds of which are part of BioMed Central. As yet, the commercial publishers have refrained from responding.

Another recent initiative that is worth mentioning is the "Budapest Open Access Initiative" (BOAI), which commenced its activities on 14 February 2002 (<http://www.soros.org/openaccess/index.shtml>). BOAI's objective is to have "open access business models for scholarly communication." Academics, university administrators and librarians have been called upon to support this initiative. To date, more than a thousand have done so. Lastly, the activities of SPARC and SPARC Europe (<http://www.sparceurope.org/>) should be mentioned. BioMedCentral's alternative business model for online journals is to be considered another promising development. BMC publishes more than 50 online journals covering biology, medicine and the life sciences and is committed to providing free access to peer-reviewed biomedical research. This new publishing house operates via an institutional membership program, author fees, sales of archival paper copies, advertising and sponsorship.

of view more clearly, unnecessary misunderstandings are avoided, and better products are produced. The down side is that it has not made the “information market” any more surveyable, and there is still no solution to the “serials crisis.”

### **Scholarly information and communication: the traditional model versus new developments**

Are all these developments enough for the future? In my opinion, they are not. Electronic books and journals are still based on the traditional model of scholarly information and communication. More rapid ways of information supply are conceivable in the digital era, as well as other forms of quality assessment and peer review. As I see it, the traditional model is not going to survive the next couple of decades. However, what model will replace it is difficult to predict, since scholarly information provision has so many sides to it.

On the one hand, researchers want to communicate with each other about the research they are involved in. Their communication takes many forms, ranging from personal contact, conferences, e-mail, discussion forums, interactive news bulletins, e-communities, and the telephone, to research memoranda, preprints and the like. This last category may take a variety of forms, all of which are characterised by their provisional nature, and frequently by the existence of various versions. On the other hand, researchers enter the arena of academic communication in order to have their research results recognised, accredited and evaluated via peer reviews. The higher the academic standing of the peer reviewers, the more prestigious the publication that has passed the selection hurdle will be.

The first of these two forms of academic communication is unorganised and informal in character. By definition, it is not exclusive. This form of communication is ideally suited to the Internet, which is just as unorganised and informal. The second form of communication has to this point been dominated by the traditional publication model. In the 17th century, the academic journal was able to make steady progress because as a new medium it could effectively take advantage of the increased scale at which academic communication was taking place. However, does it necessarily have to retain this form in our digital era, with all the new possibilities that ICT and the Internet have opened up?

Electronic journals, including those put out by commercial publishers, are already starting to take different forms, forms that combine the two aspects of informal communication and formal assessment and accreditation. Some are starting to develop towards being academic web sites which, besides publication of articles, also provide other things, including note facilities, literature overviews, discussion facilities, and so on. In fact, a lot of journals are developing into academic forums for specialists within particular fields.<sup>6</sup> I am convinced that scholarly journals in their time-honoured form will gradually change into academic networks or information environments, able to offer the researcher and student more than the printed journal because of its greater flexibility and ability to integrate material<sup>7</sup>.

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<sup>6</sup> The term “virtual community” is frequently used in this context.

<sup>7</sup> See: A.M. Odlyzko, Tragic loss or good riddance? The impending demise of traditional scholarly journals. *International Journal of Human-Computer Studies* (formerly *International Journal of Man-Machine Studies*) 42, 1995, pp. 71-122. See also: Carol Tenopir and Donald W. King, *Towards Electronic Journals. Realities for Scientists, Librarians and Publishers*. Washington : SLA Publishing 2000.

The question we need to ask is how these “new style” journals, or more precisely, these new information forms, will differ from the “open archives” that have been appearing along institutional (“institutional archives” or “institutional publication sites”) and discipline lines (“subject archives” or “subject publication sites”). Starting out as preprint services aimed at stimulating discussion, many of these facilities are now starting to develop into more formal channels of publication. In doing so, they are not merely fulfilling the need for greater exchange of ideas at the academic level, they are also fulfilling the need for recognition and accreditation of research results. I have the impression that at a certain moment in time “open archives” and academic journals are going to fuse into a single communication medium, a medium that I described previously as academic networks. In the near future, there will probably be a lot of interim forms fulfilling various functions, and we can expect both commercial and non-commercial parties to undertake such initiatives. The portal and linking techniques that are now being developed will no doubt increase this trend considerably, with standardisation preventing information forms and files from becoming too heterogeneous. It is too early to predict what the future will be like in this regard: the processes have not yet shown signs of settling into definite patterns. Nevertheless, I would wager that academic journals in their current form will eventually lose their dominance, and that other forms and mechanisms serving the goal of communication at the academic level, as well as other ways of evaluating and accrediting research results, will come into being.

What about peer reviews? Will reliable quality assessment still be possible in the new situation? The present system of peer review and citation analysis that was started by Eugen Garfield and developed and exploited by the Institute of Scientific Information (ISI) is such an essential part of the academic world that one can hardly imagine it being replaced by alternative systems in the near future. Nevertheless, ICT and the Internet do offer promising new alternatives. The activities that a number of information technology researchers from the NEC Research Institute have been working on for the last few years in the area of what they have termed the “autonomous citation indexing” of electronic publications are worthy of mention. This system would seem to offer promising ways of eventually competing with traditional citation analysis based on ISI files and taxonomies.<sup>8</sup> Another interesting initiative in the area of peer review and quality assessment is the *Faculty of 1000*, a sort of reference service for note generation linked to a quality assessment system.<sup>9</sup> Other providers of information are also busy developing citation filtering software for their own databases.<sup>10</sup>

None of this means that the publishers have played out their role, however. It is precisely from that quarter – the publishing world – that innovative and effective initiatives can be

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<sup>8</sup> The GetCited project appears to have accelerated the activities of NEC. For further information, see <http://www.mylitsearch.org/> (search interface) and <http://www.getcited.org/about> (information about the project).

<sup>9</sup> The Faculty of 1000 wants to create a sort of virtual faculty, or more precisely, a scientific network in the field of biology and related disciplines. The web site of the Faculty of 1000 (<http://www.facultyof1000.com/>) mentions 16 “faculties,” each with 3 to 12 “departments” of between 10 and 50 members. These members have been carefully selected from a field of experts in certain areas of biology. Their brief is to select new publications and give them ratings such as “recommended”, “must read” or “exceptional” (3, 6 or 9 points), as well as propose the area for which the article is most relevant. These “votes” are then added up and averaged, and a sort of quality assessment thus provided. This system has the potential to become a good alternative for the quantitative data-based ISI taxonomy of the *Citation Index* and the *Journal of Citation Reports*. Researchers and institutions can subscribe to the Faculty of 1000. To date, the Faculty of 1000 has made dozens of online journals available for free. It finances the journals by asking the authors to pay “author fees” (\$500 per article). As well as this, it also calls on institutions to become “institutional members” (authors who are members of such institutions do not have to pay author fees!)

<sup>10</sup> Two examples of these are *Chemical Abstracts* and *Psychinfo*

expected. They, rather than the universities, have the financial resources to invest in such initiatives on a large scale. It is to be hoped that by being active in the field of electronic publishing and by developing various new methods and techniques of the type that I have just mentioned, the academic world will also create a strong enough position for itself in the area of information provision to be able to rectify and stabilise the market's disturbed equilibrium<sup>11</sup>. I think that it is also obvious that completely new players are going to come onto the scene,<sup>12</sup> though it is not yet clear which of these are going to be able to develop facilities good enough to cope with the desires and needs of researchers and students, and do so for the right price.

### **The position of libraries and library employees<sup>13</sup>**

In view of all this, the intriguing issue as far as library employees are concerned is what sort of a role is left for them and for their libraries to play. Since the developments are so difficult to oversee and to predict, what is the best way for libraries to react? What matters ought to be prioritised? Is it sensible to continue to put personnel resources into the traditional library tasks of selection, acquisition, classification and making printed material available for loan? Should libraries concentrate mainly on providing digital library services, or would they be better off taking it for granted that third parties will provide such services anyway? Should libraries be active in the area of electronic publishing, or does the strong position that publishers and other suppliers of information occupy mean that their efforts will never amount to much? Is there a future for the library, or is it on a dead-end road?

All these new developments notwithstanding, I think that there is no doubt that a library's main role – its mission, if you like – is essentially what it always has been: backing up and promoting learning and research by satisfying the demand for high-quality information and the services associated with acquiring it. To put this in more concrete terms, the task of a library and its employees is to ensure a top-class information provision infrastructure to meet the needs of researchers, teachers and students. Qualitative education and research depends partly on the availability of such a structure. The question of how libraries should approach the task still remains, of course, though I do not believe that there is any one way of answering it. All sorts of choices will have to be made, since every institution's resources are limited to some degree. As I see it, there are a number of important task areas – fields of interest, if you like – that every library organisation is going to have to focus on in the years to come. Striking a balance is the key thing: policies must not focus on one particular area to the detriment of others, and this includes the digital area and innovative technologies.

### **Traditional and new tasks**

I attach great importance to the fact that a library is a collection of printed literature, and want to stress that it should remain so, along with all the traditional tasks that it has customarily performed, including acquisition, cataloguing, subject classification and making material available for loan. Even though digital information is becoming increasingly important in

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<sup>11</sup> See A. Odlyzko, *Competition and Cooperation: Libraries and Publishers in the Transition to Electronic Scholarly Journals*. <http://www.amacad.org/publications/trans13.htm>

<sup>12</sup> *Ingenta*, which recently established collaborative ties with *Catchword*, is a good example of the new players. See [www.ingenta.com](http://www.ingenta.com). OCLC's activities could also be mentioned ([www.oclc.org](http://www.oclc.org))

<sup>13</sup> See also: Alex Klugkist, *Virtual and Non-Virtual Realities: The Changing Roles of Libraries and Librarians*. *Learned Publishing, the Journal of the Association of Learned and Professional Society Publishers*, 14 (3), 2001, 197-204.



some subject areas – the exact sciences, for example – printed information still plays an important role, particularly where teaching is concerned, and these subject areas are no exception. Despite the introduction of electronic learning environments, a lot of teaching and learning is still being done in the traditional way within every subject field. And I still see researchers as well dragging around loads of printed material: it is not only digital tunes we are dancing to. It is important that we ensure that collection building for the various disciplines of the university continues in such a way that the needs of students, teachers and researchers are optimally met, regardless of the medium<sup>14</sup>.

I am not suggesting, however, that we should stick to traditional ways. While the traditional tasks of a library will remain relevant in the decade to come and must not be neglected, we cannot turn a blind eye to the fact that an increasing amount of information is appearing in digital form. A library must become a gateway to digital information (or to put it in a more modern-sounding way, a portal), regardless of where this information is.

As such, every library is also going to have to become a digital library. Libraries must formulate effective acquisition and licence policies in relation to digital information, and ensure that their users can access all the information that they need for their studies or research. These are tasks – selection and collection building – that libraries have been performing for centuries, though now given a digital makeover. Reference librarians and information specialists need to be able to review what is available in the area of digital information and be able to adjust acquisitions to demand. Being able to adjust supply and demand should result in making effective decisions about what digital information should be acquired under licence, and which should not.<sup>15</sup>

Just as the librarians of the past ensured that there was effective formal and subject-based classification of printed collections (and hence access to them) by creating traditional card catalogues, present-day librarians have to ensure effective classification of and accessibility to digital collections,<sup>16</sup> wherever they may be. They should also ensure that that information is as well integrated into the various learning and research environments as possible.

As I see it, it is extremely important that libraries ensure that students have access to learning environments in which optimal use can be made of printed and electronic information as an integral part of electronic teaching and communication aids. If they are not successful in connecting electronic learning environments to digital library facilities, then they will have missed an important opportunity, both from the point of view of effective learning and efficient provision of information. The same applies to scientific research: there, too, the librarian has to ensure effective linking of supply and demand of printed and digital information and effective integration of the information provision infrastructure with the researcher's knowledge environment, both at the content and the technological levels.

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<sup>14</sup> W.Crawford, *Paper persists: Why physical library collections still matter*. Online, Jan. 1998

<sup>15</sup> Collection building policy should then be appraised and, if necessary, adjusted on the basis of statistical data. As far as digital information is concerned, libraries ought to exert pressure on suppliers of information to supply detailed information on usage.

<sup>16</sup> How libraries should go about classifying freely accessible Internet sources is an interesting question. It goes without saying that libraries will have to do this in conjunction with each other, though the question still remains a difficult one to answer, as the discussions within UKB (the Dutch Cooperative of University libraries), which have gone on for years on end, about whether there is any desire (and if so, how much) for participation in bibliographical Internet-databases like DUTCHess, Renardus, CORC and so on, would seem to indicate.

The task area is complex and there are many sides to it. In the first place, it requires reference librarians being able to make recommendations for new acquisitions and information specialists knowing what the quality of the various relevant databases is. It is also important that they be well aware of the various ways in which all these databases can be used: whether they are readily accessible, how they are structured, what navigation and retrieval possibilities and what linking facilities are available, how data is downloaded.

Who can see the wood for the trees? Who knows the way? The information specialist, hopefully. There is no way around it: libraries have to become centres for information expertise. They have to create a modern study and research environment staffed by experts able to give users the support they need. Library staff have to develop good helpdesk functions and make them available with effective front and back office facilities (first and second-line support). The design and maintenance of well-organised physical and electronic information desks is another necessity. As I see it, offering the right sort of assistance and providing in-depth information about the options and facilities at the library user's disposal is of crucial importance if we are to make the most of the investments that have been made in acquiring information and ways of using it. Every time I look into it, I am struck by how little most users really know about the information and information facilities that are available.

### **Extended ambitions: looking after the information chain**

Libraries have to set their sights even higher, however. In conjunction with the various relevant parties within the university, a university library must aim at ensuring that the university is capable of controlling and maintaining the entire chain of information all by itself. In other words, it has to develop the expertise to help researchers, research groups and students make their publications electronically available according to international standards. The library is in any case responsible for providing proper technical and organisational support in the sense of classification, accessibility and filing. This responsibility has to tie in with the editorial responsibility and responsibility as regards content exercised by the researchers and teachers themselves.

It is a relatively new focus. Without depriving researchers of their freedom to publish their research results where they choose, every university has to be able to offer publication facilities. Developing and maintaining institutional archives or digital publication sites that researchers and research institutes can avail themselves of if they so desire must be viewed as an essential part of every university's brief.<sup>17</sup> It goes without saying that in doing so, it must link up at the national and international levels. It is a task terrain that is not the exclusive preserve of a library, or even has to be, but one in which a library, with all the expertise it has at disposal, ought to at least be one of the players.

Besides, the librarian should take care of archiving not only printed, but also digital material. Archiving digital material however is a rather complicated task. On the one hand the library is responsible for archiving digital material created by her own institution (in concert with national repositories). On the other hand the library's impossibility to archive all licensed

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<sup>17</sup> Almost all of the universities in the Netherlands are active in this terrain. One good example is the production platform set up by the University of Amsterdam. Projects like Roquade (University of Utrecht and the Technical University of Delft, cooperating now with other European institutions in the frame of the FIGARO-project, financed by the European Commission) and ARNO (University of Amsterdam, University of Brabant and Technical University of Twente) are going to result in publication platforms for their researchers. The University of Groningen is carrying out a similar initiative in cooperation with the university libraries of Osnabrück and Bremen: [www.ub.rug.nl/bib/ddd](http://www.ub.rug.nl/bib/ddd)

digital material she is giving access to should be acknowledged. Here, the library has to promote reliable and thrustworthy archiving policies of publishers, learned societies and (supra-) national library institutions<sup>18</sup>.

### **Some concluding comments**

A library that operates within the terrain I have described will have both traditional and digital aspects to it. It will be partly location-based, and partly not. It must be a recognisable and clearly visible part of the university, and it is essential that it have modern study facilities to entice students and researchers to work within its walls. Building a virtual library does not make a library with walls redundant. And not only because a library's collections of printed information needs to be housed: to teach and to be taught also requires physical space.

How a library chooses to divide its resources among these tasks will depend on the nature of its target groups, and will thus differ from one institution to another. Every library organisation will have to develop its own policies. If it makes the wrong decisions, there is no certainty that it will continue to exist. It is absolutely essential (and at the same time a challenge) to make efficient plans for providing scholarly information and to muster broad-based support.

As well as developing policies, it is equally important to train library staff. Libraries have to be prepared to invest in their human resources if they want high-quality, flexible staff. To meet the demands that are being made of them, libraries have to make sure that their staff have sufficient possibilities to acquire new knowledge and skills in the area of information provision. They must give their on-going attention to schooling and training.

I started off by mentioning that the library is higher on the list of administrative priorities than it has ever been before. As such, I see absolutely no reason to be pessimistic. There are challenges galore, and enough opportunities for libraries to obtain the recognition and resources they need for the tasks they have to perform. There is no doubt that they will have to experiment to find the right recipe, and mistakes are inevitable. However, as I see things, the opportunities for libraries and library staff – who are closer to the user and know better their information needs and demands than any other organisation – to play a central role in the domain of scholarly information provision are greater than they have ever been.

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<sup>18</sup> Rudy Baum, Another digital divide. In *C&EN: Science & Technology*, April 29, 2002, vol 80, number 17. CENEAR 80 17 p. 33 (accessible via <http://pubs.acs.org/subscribe/journals/cen/80/i17/print/8017sci6.html>)